

Competitiveness of Indonesia's edible-nest swiftlet exports

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Abstract. Competitiveness is one of the essential factors in increasing exports of agricultural commodities to export markets. Indonesia is a significant producer and exporter of swiftlet nest products globally. This research aims to study Indonesian edible-nest swiftlet competitiveness and development potential in the primary export destination market in the RCEP (the Regional Comprehensive Economic Partnership Agreement) area. The study uses secondary export-import data between countries sourced from UN Comtrade from 2009 to 2019. Analyze competitiveness and potential for product development using the RCA, RSCA, EPD, and IIT methods. The study results show that, comparatively, Indonesian swiftlet nests are competitive in China, Malaysia, Vietnam, and Singapore markets and are not competitive in Australia, Japan, South Korea, New Zealand, Cambodia, Laos, and Thailand. The export markets of China and Vietnam are promising because they have reached the ideal position of a rising star. Meanwhile, the Thai market has the potential to be developed because the export market is still growing. The Singapore market also needs to be considered to create high-value processed products because it has relatively strong integration with the Indonesian swallow nest production structure.

1 Introduction

The edible-nest swiftlet (ENS) is one of Indonesia's leading export commodities from the livestock sub-sector. During the 2013-2020 period, the amount of ENS exports reached 74.70% of the total exports of livestock commodities [1]. Indonesia is the leading producer of ENS with good quality in the world. This shows that Indonesia controls a world market share of 80%. Besides Indonesia, several countries in Southeast Asia are producers of this product, namely Malaysia, Thailand, Vietnam, and the Philippines [2,3]. Thailand and Malaysia are the second and third larger producers, respectively [4,5]. Since 2019, the

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Indonesian government has been committed to intensifying ENS export through the GraTiEks program (Export Triple Movement) through the Ministry of Agriculture. Operationally, this activity is coordinated by the Directorate General of Ditjen PKH [6].

The downstream program is already running on ENS exports from Indonesia. Therefore, exported ENS are processed and washed products that can be increased added value and competitiveness. The price of raw materials alone in the country has reached IDR 10-30 million/ kg in 2020 [7], so this business is very promising if exported abroad. Swallow's nest can be gotten in many areas of Indonesia, from the western region (Java, Kalimantan, Bali, West Nusa Tenggara, and Sumatra), the central region (Sulawesi), to the eastern region (Maluku). The origin of swallow cultivation began in East Java Province in 1880 [8,9]. The swallow's nest is ecologically and economically [10] useful for the environment and humans.

Regarding ecology, swallows serve as biological predators against insects considered pests for cultivated plants. In terms of an economic perspective, a swallow's nest is a valuable and luxurious product [11], so it is very expensive worldwide. It is often referred to as caviare from the East or tropical white gold [5,12].

Considering that Indonesia is an important exporter of ENS globally, this country has an opportunity to develop the export market is very open. One of the big and potential markets is the market in the RCEP (*Regional Comprehensive Economic Partnership*) area [13]. The trade agreement within the framework of the RCEP that was signed on November 15, 2020, by representatives of member states became a mega-regional free trade area with uniform trade rules to improve market access among its member states. The market in the RCEP region covers 15 economies. They are Indonesia, Malaysia, Singapore, Brunei Darussalam, Thailand, the Philippines, Vietnam, Myanmar, Lao PDR, Japan, South Korea, Cambodia, China, New Zealand, and Australia. Until 2021, the demand for ESN has increased since the 1990s [3], especially in China, the largest market, followed by Hong Kong, Vietnam, Singapore, and the United States [11,1].

Several studies state that Indonesia has an excellent chance to fill in the needs of ESN in the world because it has good product quality [10] and high economic value in the ASEAN region [7]. However, studies related to the analysis of export performance and the level of competitiveness of Indonesia's ESN in the export destination, especially in the RCEP region, are still stammering. Hence, this study aims to learn and understand the swiftlet nests' competitiveness and development potential in the main destination market in the RCEP area.

2 Materials and methods

2.1 Materials

This research utilizes secondary data time series yearly from 2009 to 2019 worldwide coverage and HS code 041000 [14]. Secondary data comes from Trade Map, UNComtrade, Central Bureau of Statistics, Ministry of Agriculture, and Ministry of Trade.

2.2 Methods

The data analysis uses tables and graphics to point out changes of Indonesian share export to the RCEP area's destination market over ten years. The analytical method developed by Startiene and Remeikiene was used [15] to analyze the competitiveness of Indonesian ESN. This method has been used to calculate the competitiveness of various agricultural commodities [16-18]. The analysis method begins by calculating the share of Indonesia's export from Indonesia's total exports to importing countries and compares it with the share of export value from all countries to the importing countries.

The mathematical form of RCA's formulation is as follows:

$$RCA_j = \frac{X_{ij}}{\sum_j X_{ij}} \bigg/ \frac{X_{wj}}{\sum_j X_{wj}} \tag{1}$$

Where, RCA_j was Degree competitiveness of ENS from Indonesia to country i ; X_{ij} was Indonesia's ENS export value to country i (USD); X_{wj} was Export value of all commodities from Indonesia to country i (USD); $\sum_j X_{ij}$ was Export value of ENS from the world to country i (USD); $\sum_j X_{wj}$ was Export value of all commodities from the world to country i (USD); J was ENS; and I was Country i .

The use of the RCA method has a drawback, namely the presence of the problem of the unsymmetrical RCA value. The RCA value of >1 is called competitive, but the value is not limited, so it cannot be compared on both sides to be symmetrical. Therefore, the comparative competitiveness analysis is continued with the normalization of the RCA value by implementing the RSCA (*Revealed Symmetric Comparative Advantage*) index. The RSCA is a simple modification of the RCA so that its value ranges from -1 to 1 [19-21]. The RSCA is formulated as follows:

$$RSCA_{ij} = (RCA_{ij} - 1) / (RCA_{ij} + 1) \tag{2}$$

where:

$RSCA_{ij} > 0$ = country has a comparative advantage of ENS

$RSCA_{ij} < 0$ = country does not have a comparative advantage of ENS

Following Estherhuizen, to measure the dynamics of ENS competitiveness in the destination country, the author uses the Export Product Dynamic (EPD) method [22]. The EPD method consists of a matrix that puts ENS into four behaviors [23], as shown in Table 1. The ENS's status in Table 1 is convertible into quadrants, as depicted in Figure 1. Status in the quadrant represents a commodity's business ability (X-axis) and market interest (Y-axis). Business ability is analyzed from the percentage of market growth of importing country. On the contrary, market interest is calculated based on demand growth in country destinations. Therefore, the association between market interest and business ability generates the action of ENS's status in these four quadrants.

Table 1. ENS's competitiveness status in EPD

Percentage of Indonesia's export in global trade	Percentage of ENS in the global market	
	Rising (dynamic)	Falling (static)
Rising (competitive)	Rising star	Falling star
Falling (non-competitive)	Lost opportunity	Retreat

Mathematically, business ability (X-axis) was formulated as follows:

$$\frac{\sum_{t=1}^n \left(\frac{X_{ij}}{X_{iw}} \right)_{t-1} \times 100\% - \sum_{t=1}^{t-1} \left(\frac{X_{ij}}{X_{iw}} \right)_{t-1} \times 100\%}{T} \tag{3}$$

Meanwhile, market interest (Y-axis) was formulated:

$$\frac{\sum_{t=1}^n \left(\frac{X_j}{X_w} \right)_{t-1} \times 100\% - \sum_{t=1}^{t-1} \left(\frac{X_j}{X_w} \right)_{t-1} \times 100\%}{T} \tag{4}$$

Where, X_{ij} was Indonesia's ENS export value to country i (USD); X_{iw} was Export value of worlds' ENS to country i (USD); X_j was Export value of all commodities from Indonesia to country i (USD); X_w was Export value of all commodities from the world to country i (USD); T was Number of years; T was Year t .

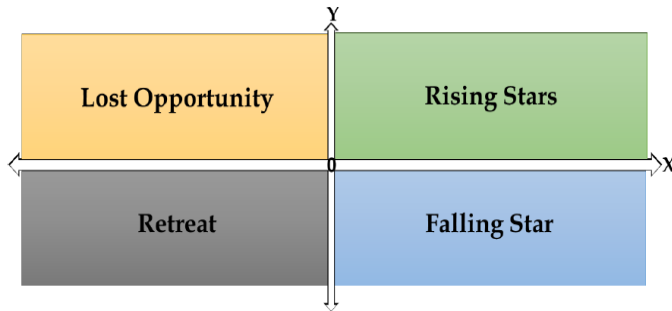


Fig. 1. Competitiveness position of the commodity by using the EPD method

The rising star status is ideal and has the top rank in export trade, so the share is growing quickly. On the contrary, a lost opportunity is an unforeseen position resulting from reducing the domestic market share when the export market is still growing. The falling star is a worse lost opportunity position, meaning an increasing percentage of ENS in the importing country; however, a lower portion of a commodity in the global market and ENS's trade in importing countries are no longer dynamic. Ultimately, the retreat position pointed the ENS was static and not competitive in the export market.

Furthermore, the Intra-industry trade index (IIT index) is used to analyze the level of integration in a particular region and describe trade interdependence between two countries. According to Salvatore, IIT begins with the theory of comparative advantage, in which a country with a comparative advantage in certain commodities exports these commodities and vice versa. The country imports commodities that are not the country's advantage [24]. The basis of the IIT method is product differentiation and economies of scale. Conditions of international competition force companies to concentrate on producing only a few types of products with the best quality and price. This new trade theory can reduce production costs and on the other hand, consumer needs for other products can be met through imports. The commonly used intra-industry trade (IIT) index is the Grubel-Lloyd index with the formula [25]:

$$IIT = \frac{\sum_{i=1}^n (X_i + M_i) - \sum_{i=1}^n |X_i - M_i|}{\sum_{i=1}^n (X_i + M_i)} \times 100 \tag{5}$$

Where i was i^{th} industry; X was export; and M was import.

The value of the Grubel-Lloyd Index is 0 to 100. If the value is close to 0, trade is inter-industry, meaning that trading activities involve only one party (exports or imports). On the other hand, if the index is close to 100, trade is intra-industry, meaning that the amount exported is almost the same as the amount imported for a product. Meanwhile, Austria's classification of the IIT value is as Table 2 [26].

Table 2. Classification of IIT values

IIT values	Classification
0,00	no integration (one-way trading)
>0,00 – 24,99	weak integration
25,00 – 49,99	medium integration
50,00 – 74,99	strong integration

3 Results and discussion

3.1 Export performance of Indonesian nest swiftlet

The total volume of Indonesian ENS export by main destination countries during 2016-2020 globally is presented in Figure 2 and Figure 3 [1]. Hong Kong and China are in the top ranks of volume, namely 47.95% and 52.74% of Indonesia's ENS export.

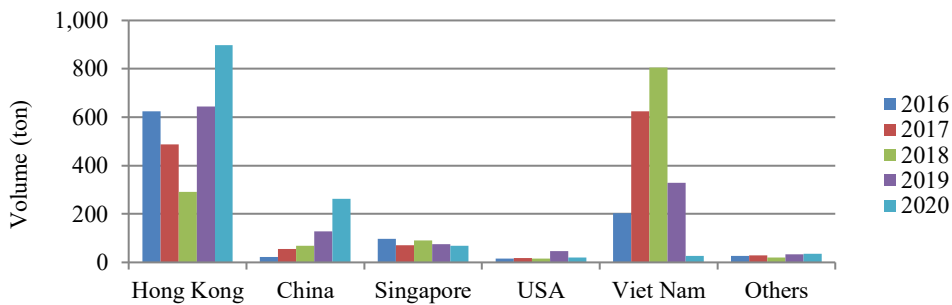


Fig. 2. Export volume of Indonesian edible-nest swiftlet by main market, 2016-2020

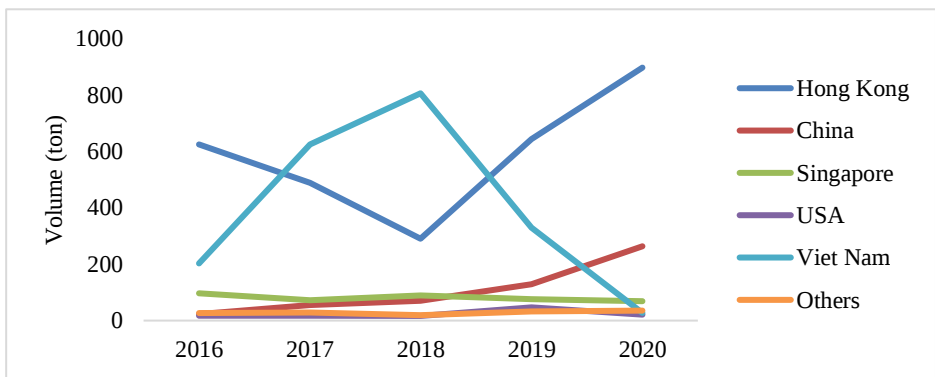


Fig. 3. Export volume of Indonesian edible-nest swiftlet by main market, 2016-2020

Nine member countries of the Regional Comprehensive Economic Partnership are the major importer of ENS commodities from Indonesia. These countries are Singapore, China, Vietnam, Japan, Thailand, Malaysia, South Korea, Laos, and Australia. The three export destinations for Indonesian ENS with the largest market share are Singapore, Vietnam, and China, with a volume market share of 53%, 32.9%, and 6.7% of the total RCEP market (Table 3). The Chinese and Vietnamese markets have prospects and potential to continue to be developed because they have positive growth in importing ENS from Indonesia, which are 28.3% and 17.1%, respectively. On the other hand, the Singapore market did not respond positively to Indonesia's ENS products because its import growth decreased throughout the year, which was 17.1%. This is due to Singapore expanding its market to Vietnam. Overall, Indonesia's ENS exports to markets in the RCEP region have a positive growth of 10% per year, with an export value of USD 108.2 million. Thus, it can be said that the export value of Indonesia's ENS is high value and can be a source of foreign exchange.

Table 3. Indonesia's edible-nest swiftlet export to RECP region, 2009-2019

Year	Singapore		Viet Nam		China		RECP	
	Volume (000 tons)	Value (USD 000)	Volume (000 tons)	Value (USD 000)	Volume (000 tons)	Value (USD 000)	Volume (000 tons)	Value (USD 000)
2009	314	64.2	9	21.0	2	728.0	474	67.9
2010	392	96.3	0	1.0	10	4.7	407	103.9
2011	222	105.8	0	0	23	12.2	255	120.6
2012	132	77.1	0	3.0	16	434.0	155	80.1
2013	194	64.8	16	3.6	1	142.0	223	71.1
2014	132	40.0	42	6.8	0	0	209	49.2
2015	100	20.8	124	5.9	18	16.4	253	45.7
2016	97	18.4	204	6.5	23	35.7	334	63.4
2017	72	8.3	633	19.2	55	102.9	778	134.1
2018	90	20.3	798	25.9	70	140.5	968	190.7
2019	76	30.8	330	10.7	129	19.1	558	263.8
Average	165.5	49.7	96.0	9.4	31.5	148.7	419.5	108.2

Thailand, Malaysia, and the Philippines are Indonesia's competitors in ENS exports. However, Indonesia is still superior in terms of quality [27]. In 2005, ENS's export performance decreased because exports to the RCEP market were carried out by Malaysia and Singapore as intermediary countries and were recorded as exports originating from both countries. This is because the bird flu issue hits Indonesia, so Indonesia is not allowed to export ENS directly to China. ENS consumers in China need high-quality standards of ENS for domestic consumption. Currently, most Chinese people are consuming ENS as a tonic and functional food that is believed to be a cure for various diseases [28]. Exports of edible nest swiftlets to China reopened in 2017, and from 2019 to 2021, this country became an important market for Indonesia's ENS.

3.2 The competitiveness of Indonesian edible-nest swift in the RCEP area

The RCEP is an important market for Indonesian edible-nest swiftlet. The result of the comparative competitiveness analysis of this commodity based on the Revealed Symmetric Comparative Advantage (RSCA) method shows the highly competitive in China, Malaysia, Viet Nam, and Singapore (Table 4). Meanwhile, it was not competitive in Australia, Japan, South Korea, New Zealand, Cambodia, Laos PDR, and Thailand as indicated by RSCA index value of lower than 0 (zero). However, two countries within the RCEP region, namely the Philippines and Brunei Darussalam, did not import ENS during 2009-2019.

Table 4. The value of Indonesia's edible-nest swiftlet based on the RSCA method in the export destination countries, 2009-2019

Year	Australia	China	Japan	South Korea	New Zealand	Cambodia
2009	-0,70	0,53	-0,11	-1,00	-1,00	-1,00
2010	-1,00	0,84	-0,37	-1,00	-1,00	-1,00
2011	-1,00	0,90	-0,42	-1,00	-1,00	-1,00
2012	-0,97	0,72	-0,15	-1,00	-1,00	-1,00
2013	-0,76	0,53	-0,39	-1,00	-1,00	0,91
2014	-0,96	-1,00	-0,69	-0,40	-1,00	0,89
2015	-0,85	0,88	-0,41	-1,00	-1,00	-1,00
2016	-0,50	0,90	-0,40	-1,00	-1,00	1,00
2017	0,40	0,91	-0,06	-1,00	-0,70	0,99
2018	0,12	0,89	-0,90	-0,94	-1,00	-1,00
2019	0,74	0,90	-0,98	0,14	-0,96	-1,00
Average	-0,50	0,64	-0,44	-0,84	-0,97	-0,29

Table 4. Continued of the value of Indonesia's edible-nest swiftlet based on the RSCA method in the export destination countries, 2009-2019

Year	Lao PDR	Malaysia	Thailand	Viet Nam	Singapore
2009	na	0,97	-0,97	0,94	0,76
2010	na	0,96	-0,98	0,53	0,75
2011	na	0,95	-0,69	-1,00	0,62
2012	na	0,90	0,04	0,05	0,63
2013	na	0,91	-0,11	0,96	0,64
2014	-1,00	0,92	0,05	0,97	0,62
2015	-1,00	0,60	-0,88	0,97	0,45
2016	-1,00	0,72	-0,92	0,94	0,43
2017	-1,00	0,84	-0,94	0,98	0,06
2018	0,94	0,39	-0,96	0,98	0,40
2019	na	0,91	-0,98	0,94	0,65
Average	-0,61	0,82	-0,67	0,66	0,55

Note: na (not available)

Furthermore, the competitiveness analysis result based on the Export Product Dynamic (EPD) method revealed that Indonesia's edible-nest swiftlet had been in the desired position (rising star) in the Chinese and Vietnamese markets for the last ten years (Table 5). These two markets were promising markets since the share of total market export of edible-nest swiftlet was fast-growing dynamically. On the contrary, in the Thai market, the position of Indonesia had a lost opportunity. This market is quite open for Indonesia; however, Indonesia could not take advantage of this opportunity. Therefore, it is required to accelerate the increase in the volume of exports to this country. The undesirable position occurred for Indonesia's edible-nest swiftlet export, namely falling stars in Australia, South Korea, New Zealand, and Lao PDR. Although, the worst position (retreat) in Japan and Singapore, the edible-nest swiftlet export to these countries was no longer growing.

Table 5. The position of Indonesia's ENS in the major export destination, 2009-2019

Export market	Average growth of export share (%/year)	Average growth of total export share (%/year)	Position
Australia	1,55	-0,30	Falling star
China	8,09	0,16	Rising star
Japan	-0,77	-0,30	Retreat
South Korea	0,71	-0,21	Falling star
New Zealand	0,01	-0,06	Falling star
Cambodia	-25,00	-0,39	Retreat
Lao PDR	4,11	-0,03	Falling star
Malaysia	-49,88	-0,21	Retreat
Thailand	-0,02	0,03	Lost opportunity
Viet Nam	12,87	0,01	Rising star
Singapore	-2,94	-0,16	Retreat

Policies in importing countries affect the behavior and competitiveness of Indonesian ESN commodities. For example, in 2021, China was obliged to register ENS producers (exporters) by the Certification and Accreditation Administration (CNCA) for imported food products unilaterally. This policy resulted in Indonesia no longer being able to export ENS directly to China. Instead, ESN from Indonesia must go through the sanitation and phytosanitary inspection stages and obtain administrative certificates and accreditation. This licensing system is quite complex and non-transparent, and discretion (freedom to make one's own decisions) applies to ENS imported from Indonesia [29]. Therefore, ESN exporters from Indonesia are advised to pay great attention to the issue of hygiene standards, considering

that this product is very expensive because it contains high protein [30, 31], which is useful for health.

3.3 Development potential of Indonesian edible-nest swiftlet in the RCEP area

Operationally, IIT is an index of trade engagement between countries that export and import similar but not the same goods, for example, different qualities or varieties classified within the same sector simultaneously. The higher value of the IIT index, the stronger the integration of a country's particular industry in the export market, the stronger the integration of these industries in regional and global value chains. Empirical evidence shows that the more developed a country is, the more developed its industry, the higher the added value of its export activities, and the higher the value of its IIT index.

The results of the IIT analysis of ESN from Indonesia in the export destination country can be seen in Table 6. Indonesian ESN has strong trade integration only in Singapore with an IIT index of 54.40% during the period 2009-2019. Only in Japan, the trading position of ESN Indonesia has moderate integration. Meanwhile, in most countries in the RCEP region, integration remains relatively weak, and in the other six countries of ENS trade, there is no integration at all. The weak integration can be improved by strengthening mutually beneficial bilateral cooperation. Furthermore, it can be interpreted that the potential for export development of Indonesian ESN is still open with the developing highly valued processed products even though raw materials do not have to be produced domestically.

Table 6. Indonesia's edible-nest swiftlet export to RECP region, 2009-2019

Country	IIT	Classification
China	6,90	weak integration
Japan	34,17	medium integration
South Korea	1,92	weak integration
Australia	14,75	weak integration
New Zealand	0,00	no integration
Singapore	54,40	strong integration
Malaysia	6,03	weak integration
Thailand	5,85	weak integration
Vietnam	0,16	weak integration
Philippines	0,00	no integration
Brunei Darussalam	0,00	no integration
Cambodia	0,00	no integration
Myanmar	0,00	no integration
Lao PDR	0,00	no integration

4 Conclusions

This research implies that Indonesian edible-nests swiftlet is competitive in China, Malaysia, Vietnam, and Singapore markets and is not competitive in Australia, Japan, South Korea, New Zealand, Cambodia, Laos, and Thailand. The export markets of China and Vietnam are promising, meanwhile the Thai market has the potential to be developed because the export market is still growing. The Singapore market also needs to be considered to create high-value processed products because it has relatively strong integration with the Indonesian edible-nest swiftlet production structure.

The policy recommendations from this research are the need to strengthen synergies among related stakeholders, especially the Agricultural Quarantine Agency, the Directorate General of Livestock and Animal Health, and the Ministry of Trade with related ministries

and institutions. Furthermore, as the upstream or production process supervisor, the Ministry of Agriculture must supply information related to the market share and export requirements to avoid refusal when the exported eligible-nest swiftlets have arrived at the export market.

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References

1. Badan Pusat Statistik, *Ekspor Sarang Burung Menurut Negara Tujuan Utama, 2016-2020* (2021)
2. J. Tangjitmanngamkul, *European J. Bus. and Manag.* **11**, 13, (2019)
3. Y. Ito, K. Matsumoto, A. Usup, and Y. Yamamoto, *Ecosystem Health and Sustainability.* **7**, 1 (2021).
4. J. Sharifuddin, L. Ramalingam, Z. Mohamed, and G. Rezai, *J. Food Product Mark.* **20** (2014)
5. Q. Hao, LOOI, A. Rahman, and Omar, *Pertanika J. Scholarly Research Review* **2**, 1 (2016)
6. Direktorat Jenderal Peternakan dan Kesehatan Hewan, *Proses Sertifikasi dan Hambatan Pemasaran Sarang Burung Aallet. Ministry of Agriculture* (2021)
7. A.W. Susanto, and Y.A. Nainggolan, *Proceeding IEOM Society.* 6047-6057 (2021)
8. A. Mardiasuti, *Swiftlet Farming in Indonesia: Opportunity, Challenge, and Sustainability* (Bogor, 2011)
9. C.K. Lim, and Cranbrook, *Swiftlets of Borneo: Builders of Edible Nests*, 2nd. Natural History Publication (Borneo, 2014)
10. R.N. Suciati, Usman, and R.D. Kantari, *J. Ekon. Bisnis.* **17**, 2 (2020)
11. C.C. Thorburn, *Human Ecology J.* **43**, 1 (2015)
12. M. Mursidah, A. B. Lahjie, Y. Rayadin, Y. Ruslim. *Biodiversitas J.of Biological Diversity*, **21**, 7 (2020)
13. H.J. Purba, Erwidodo, D.H. Azahari, R. Elizabeth, F.B. Marojahan, Wahida, J. Hestina, and E.S. Yusuf, *Strategi Peningkatan Ekspor Komoditas Pertanian Unggulan* (Bogor, 2021)
14. UN-COMTRADE. 2021. United Nation Commodity Trade Statistics Database (2021)
15. G. Startiene G and Remeikiene R, *Procedia - Soc. Behav. Sci.* **110**, 428 (2014)
16. M.Purnamasari, N. Hanani, and W.C. Huang, *Agric. Socio-Economic J.* **1**, 58 (2014)
17. P.E. Wiranthi, and F. Mubarak F, *KnE Life Sci.* **2**, 339 (2017)
18. H.J Purba , E.S. Yusuf, J. Hestina J, *E3S Web Conf.* **232**,1 (2020)
19. K. Laursen, *Working Paper*, 98-30 (1998)
20. B. Dalum, K. Laursen, B. Verspagen, *Industrial and Corporate Change*, **8** (1999)
21. P. Shijoj P, and V.C. Mathur, *Agric. Econ Research Review*, **21** (2008).
22. D. Esterhuizen, *An evaluation of the competitiveness of the South African agribusiness sector* (Bogor 2026)
23. R.L. Kusuma, M. Firdaus, J. Manaj. dan Agrib.**12**, 3 (2015)
24. D. Salvatore, *International Economics*, Fordham University, Wiley (2013)

25. K. Sharma, J. Econ. Integ. **19**, 3 (2004)
26. M.S. Austria *The pattern of intra ASEAN trade in the priority goods sectors*, (2004)
27. P.D.J Sari, and I.K Sudiana, E-jurnal Ekon. Pemb **11**,1 (2022)
28. S.L. Chua, and S.N. Zukefli, J. of Integrative Medicine, **14**, 1 (2016)
29. Badan Karantina Pertanian, *Sidang Komite SPS-WTO Ke-58 tanggal 15-18 Oktober 2013 di Jenewa: Indonesia angkat isu specific trade concerns (STC) terkait hambatan ekspor sarang burung walet asal Indonesia ke China*, (2013)
30. W.J. Wu, L.F. Li, H.Y. Cheng, H.Y. Fung, H.Y. Kong, T.L. Wong, Q.W. Zang, M. Liu, W.R. Bao, C.Y. Huo, and Q.B. Han, *Molecules*, **27**, 2945 (2022)
31. H.J Purba, Erwidodo, J. Hestina, E.S Yusuf, D.H Azahari, F.B Dabukke, and V. Darwis, *IOP Conf Ser: Earth Environ.Sci.* **892** (2021)